

# Microlaparoscopic-Assisted Lumboperitoneal Shunt in the Lateral Position for Pseudotumor Cerebri in a Morbidly Obese Adolescent

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## ABSTRACT

**Background:** Pseudotumor cerebri or idiopathic intracranial hypertension is a known complication of morbid obesity that often requires neurosurgical intervention for worsening symptoms. Placement of a lumboperitoneal shunt (LPS) is one of the treatment options, but in a morbidly obese patient it can be technically challenging. We describe the use of 3-mm instrumentation for assistance in placing the peritoneal end of the shunt.

**Case Report:** A 16-year-old morbidly obese girl with a diagnosis of pseudotumor cerebri and decreasing visual acuity and contraction of her visual fields underwent lumboperitoneal shunt placement. Due to her body habitus secondary to her morbid obesity a microlaparoscopic-assisted approach was utilized for placement of the peritoneal end of the lumboperitoneal shunt.

**Results:** No operative or postoperative problems occurred, and she was discharged home with resolution of symptoms. Her visual acuity and fields had normalized at 3-month follow-up.

**Conclusion:** Microlaparoscopic-assisted lumboperitoneal shunt placement in the lateral position is an efficient and safe method for the treatment of pseudotumor cerebri. It is a minimally invasive, simple, effective tool for placing the peritoneal catheter for LPS.

**Key Words:** Laparoscopy, Morbid obesity, Lumboperitoneal shunt, Pseudotumor cerebri.

## INTRODUCTION

Morbid obesity is a dramatically increasing problem in the pediatric population.<sup>1</sup> Morbid obesity has numerous comorbidities, but one rare, severe complication of morbid obesity is pseudotumor cerebri. This syndrome is characterized by increased intracranial pressure despite normal cerebrospinal fluid levels and normal sized ventricles.<sup>2</sup> Untreated pseudotumor cerebri can lead to progressive loss of vision, papilledema, persistent headaches, nausea, and cranial nerve deficits.<sup>2,3</sup> This disorder is initially treated medically to decrease intracranial pressure, by using diuretics, steroids, or repeated lumbar puncture.<sup>2,4</sup> Pseudotumor cerebri often requires neurosurgical intervention for worsening symptoms, such as visual loss refractory to medical management. Neurosurgical treatment options include ventriculoperitoneal and lumboperitoneal shunting.<sup>5</sup> We describe microlaparoscopic assistance in placing the peritoneal end of the lumboperitoneal shunt in a morbidly obese adolescent.

## CASE REPORT

A 16-year-old, morbidly obese girl presented after 1 week of progressive dull headaches, nausea, vomiting, and worsening of visual symptoms that initially began as right-sided blurry vision. She had prior hospitalizations for similar complaints in which she had undergone right-sided fenestration of the optic nerve and lumbar puncture with some improvement of symptoms and was subsequently diagnosed with pseudotumor cerebri. Medical therapy with acetazolamide was started at that time but was discontinued by the patient after 2 months because of intolerance. She returned 2 years later with recurrence of symptoms. She was found on initial lumbar puncture to have an elevated intracranial pressure. During the hospital course, she was started on diuretics and steroids with little effect, but she did respond to lumbar punctures with drainage of cerebrospinal fluid. She underwent fenestration of the left optic nerve with minimal improvement. Repeated ophthalmic examinations showed progressive contraction of visual fields, diplopia and blurry vision, impaired abduction of the eye, disc edema, and decreasing visual acuity. Following an extensive workup and because of deterioration in visual ability, she underwent

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Presented as a poster at the 14th Annual Congress for Endosurgery in Children, Venice, Italy, June 2005.

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lumboperitoneal shunt. Due to her body habitus secondary to morbid obesity, a laparoscopic-assisted approach was utilized for placement of the peritoneal end of the lumboperitoneal shunt.

The procedure was performed with the patient in the lateral decubitus position with the right side up, and fluoroscopy was utilized to access the lumbar subarachnoid space (**Figure 1**). A radially expanding 3-mm trocar was then placed midway between the anterior axillary line and umbilicus. Using carbon dioxide pneumoperitoneum, a 3-mm, 30° telescope was placed to visualize the right colonic peritoneal attachment. The shunt tubing was tunneled subcutaneously from the spine to the anterior axillary line and was inserted just anterior to the right colon peritoneal attachments by using a percutaneously placed peel-away sheath and dilator under direct laparoscopic visualization (**Figure 2**). The incisions were sealed with cyanoacrylate glue.

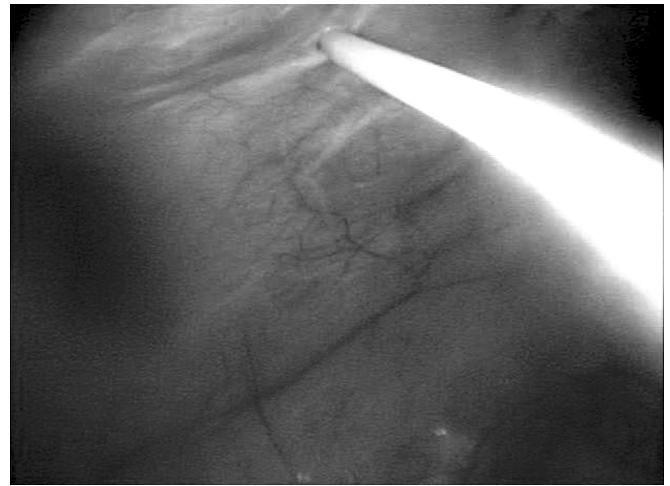
No operative or postoperative problems occurred, and she was discharged home with resolution of symptoms. Her visual acuity and fields normalized at 3-month follow-up.

## DISCUSSION

Pseudotumor cerebri is also known as benign intracranial hypertension, though it can have a clinical course that is far from benign, including the risk of loss of vision. Pseudotumor cerebri is characterized by elevated intracranial pressures, normal cerebrospinal fluid content, and a normal ventricular system. The incidence of pseudotumor



**Figure 1.** The patient is positioned in a lateral position with the right side up; the table is rotated in the opposite direction for initial trocar placement.



**Figure 2.** Lumboperitoneal shunt catheter entering the peritoneal cavity under laparoscopic visualization.

cerebri is 0.9 cases per 100 000.<sup>6,7</sup> Among pediatric patients with this syndrome, 30% are obese.<sup>8,9</sup> The exact pathophysiology of pseudotumor cerebri has not been well described, but several different theories have been postulated, including elevated cerebrospinal fluid production, cerebral edema, decreased cerebrospinal fluid absorption, and elevated central venous pressure.<sup>5,6,10–12</sup> Studies have shown bilateral sinovenous stenosis or obstruction in the venous transverse sinuses may be developmental in nature.<sup>13,14</sup> Pseudotumor cerebri often presents with pulsatile headache, and on examination, papilledema, Abducens nerve palsy, and loss of vision.

Initial treatment of pseudotumor cerebri is medical management. In morbidly obese patients, weight loss can be an effective therapy.<sup>15,16</sup> However, attempts at weight loss with a medically supervised program are not consistently successful in loss of excess weight; in addition, these usually require months of therapy. Although surgical procedures for weight loss are very successful, the application to children is still very controversial. Diuresis with acetazolamide can also be used because of its action to decrease cerebrospinal fluid production. Corticosteroids may also be used but are not useful for long-term therapy because of significant side effects. Another available therapy is repeated lumbar punctures until intracranial pressure returns to baseline.

Surgical treatment options are reserved for those patients refractory to medical management and with progressive visual loss because they can rapidly reduce intracranial hypertension. Neurosurgical interventions include ventriculoperitoneal and lumboperitoneal shunting. Lumbo-

peritoneal shunts have some advantages over ventriculoperitoneal shunts, such as reduced infection rate, anatomical and functional benefits, despite difficulty measuring intracranial pressure.<sup>17</sup>

Placement of the peritoneal end of the shunt can be technically challenging in the morbidly obese patient because the large body habitus dictates a large incision to access the peritoneal cavity. Microlaparoscopy is a minimally invasive technique that allows for accurate distal shunt placement using incisions that are 3-mm or smaller. Laparoscopic assistance allows direct visualization of the shunt tip into the peritoneum. In addition, by using a lateral position during the procedure of lumboperitoneal shunting one can avoid changing the position of an obese patient while assuring the shortest possible subcutaneous tunnel for the shunt tubing. Laparoscopic placement of a lumboperitoneal shunt provides many benefits while controlling intracranial hypertension, such as less postoperative pain, shorter hospital stay, earlier return to work, and cosmetic acceptability,<sup>3</sup> as well as minimizing morbidity from a long subcutaneous tunnel or a large abdominal wound.<sup>18</sup> These benefits appear to outweigh any technical challenges presented by taking a laparoscopic approach. Reported reasons for shunt revisions include migration, obstruction, shunt tubing fracture, and to control overdrainage.<sup>4</sup> Development of acquired Chiari 1 malformation following lumboperitoneal placement for pseudotumor cerebri has also been reported and is usually associated with overdrainage.<sup>19</sup> These complications are not specific to laparoscopically performed procedures and may occur in any lumboperitoneal shunt.

## CONCLUSION

Microlaparoscopic-assisted lumboperitoneal shunt placement in the lateral position is a safe, efficient method for the treatment of pseudotumor cerebri. It is a minimally invasive, simple, and effective tool for placing the peritoneal catheter for a lumboperitoneal shunt.

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